

Profit and Innovation Strategies in Low-Tech Firms

HOLM-DETLEV KÖHLER

Department of Sociology

UNIVERSITY OF OVIEDO

e-mail: hkohler@uniovi.es

ABSTRACT

The present article outlines the main developments of what may be called the 'new innovation theory'. This theory is based on the work of Schumpeter and combines it with the profit strategy approach. The purpose of this combination is to show that innovation needs to be embedded in coherent profit strategies in order to be effective. Innovation capacity and economic performance are much more the result of the smooth interplay between the stakeholders of firms than of high-tech or the intensity of research and development. The argument is illustrated in a comparative case-study of two firms.

Keywords: Innovation; Profit Strategies; Low-Tech.

Estrategias de beneficio y de innovación en empresas de baja intensidad tecnológica

RESUMEN

Este artículo combina la *Nueva Teoría de la Innovación* a partir de Schumpeter con el enfoque de las estrategias de beneficio para analizar la capacidad innovadora de empresas de baja intensidad tecnológica. La capacidad innovadora y la rentabilidad económica dependen mucho más de la coherencia de la estrategia de beneficio adoptada y de la fluidez de relaciones entre los principales grupos de interés en la empresa que de la intensidad tecnológica o de las inversiones en I+D. El argumento es ilustrado en un estudio comparativo de dos casos.

Palabras clave: Innovación; estrategias de beneficio; low-tech.

Clasificación JEL: A14, B25, O31.

Acknowledgements:

The author wishes to thank the members of the PILOT project (Policy and Innovation in Low-Tech, www.pilot-project.org) for the inspiring discussions that stimulated the present article, as well as for specific contributions relating to the issues dealt with in the present article.

Artículo recibido en febrero de 2008 y aceptado para su publicación en junio de 2008.

Artículo disponible en versión electrónica en la página www.revista-eea.net, ref. 26305.

1. INTRODUCTION

The starting point for modern innovation theory can be located in the departure from counterfactual neoclassical market economics, and the movement towards the insights incorporated in the later work of Schumpeter. The Austrian economist had learnt from Marx that the driving force of modern capitalism is permanent innovation and that innovation is a collective, systemic process and not — as the early Schumpeter believed — the work of heroic entrepreneurs. Schumpeter identified firms as the key organisations in innovation as they struggle for temporary monopolistic advantage in a world that is very far from neoclassic market competition models. This was the beginning of the resource-based view of the firm and evolutionary economics. Together, these two insights moved innovation theory far beyond the limited approach of transaction cost towards a more realistic and empirically backed analysis of innovation. More recently concepts of regional and sectoral innovation systems added further insights into the complexity of innovation processes.

The present article summarizes the main elements of modern innovation theory, identifying a weakness in the analysis of the strategies adopted by firms. A combination of innovation systems theories with the profit strategy approach developed by Michel Freyssenet and Robert Boyer is presented as an analytical framework which encompasses the structural determinants of innovation with the strategic factors associated with individual actors. The use of this framework also has implicit consequences for the design of effective innovation policies. The results will be illustrated in a comparative case study of innovative activities in firms belonging to industries that may be described as low-tech.

2. FROM MARX TO SCHUMPETER AND THE NEW INNOVATION THEORY

The development of innovation theory over the past three decades has involved a major reformulation, with innovation no longer seen primarily as a process of discovery (that is, of new scientific or technological principles) but rather as a non-linear process of learning. The development of innovation studies as a field rests on the rejection of the neo-classical growth model, the rejection of implicit neo-classical ideas concerning knowledge, and the rejection of a linear model of innovation¹. Innovation is path dependent, locally embedded and institutionally shaped: “The firm was reconceptualised as a learning organisation embedded within a broader institutional context” (Mytelka and Smith, 2002: 1472).

The point of departure of this institutionalist turn in innovation theory was the lessons that Schumpeter learned from Marx. The latter identified the permanent

¹ The long time dominant linear, or science-push, model conceived innovation as a sequence from basic scientific invention through product development and production to marketing, i.e. from scientific knowledge to introduction in the market.

revolution of the economic basis, including a reconstruction of the technological composition of capital, as the driving force of capitalist development. The trend towards ever greater global markets and firms leads to a systemic organisation of economy based on science. These insights prompted Schumpeter to reject his former notion of the heroic entrepreneur and to move to a concept of systemic innovation. Innovation is not an individual act, but a series or cluster of iterative and collective interactions creating novelty in the face of resistance and routine. Innovation has come to be seen as a social function of the firm and a routine, institutionalised process in big companies (Schumpeter 1942). Neither the accumulation of capital nor the employment of labour can explain long-term economic growth, which can only be explained by the capability for institutional change which facilitates innovation (Freeman, 2002). Innovation does not take place in the extreme and exceptional competitive neoclassical market but in the capitalist normality of imperfect competition and temporary monopolistic situations with extraordinary monopolistic profit as the prime motivator for innovative risk.

“To obtain a more solid understanding of innovation and what can be done to influence innovation, it is necessary to study in some considerable detail the processes involved and the way in which institutions support and mould these processes” (Nelson and Winter, 1977: 46). Innovation consists of “a new combination”, a combination of continuity (existing elements) and change (new combination), resulting in a new product, a new method, the opening of a new market, a new source of supply or the development of a new organisational scheme (Cooke and Morgan, 1998: 10). The analysis of innovation as the core dynamic of capitalist economies required a new concept of the firm that went beyond the static view of firms as little more than vehicles for reducing transaction costs. The resource based view of the firm, introduced by Penrose (1959), was the first attempt to build a dynamic model. This was later taken further by evolutionary economics. According to the latter view, firms are understood as repositories of knowledge and vehicles for continuous learning. Firm-specific resources and competences determine what a firm can do and what it cannot do. The critical resources of a firm are the non-tradable and difficult to imitate assets, mainly tacit collective knowledge hidden in organisational routines. Such tacit knowledge is distinctive and cannot be bought, but must be built (Teece *et al.*, 1997).

The key concept defining a firm’s innovative ability is ‘dynamic capability’. This refers to “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (*Ibid.*, 516). Organizational processes, shaped by the firm’s asset position and moulded by its evolutionary and co-evolutionary path, explain the essence of the firm’s dynamic capability and its competitive advantage. The firm’s activities assemble integrated clusters, spanning individuals and groups, so that they enable distinctive activities to be performed in a distinctive way. The dynamic capabilities of a firm correspond to the organizational knowledge base in other approaches (Fried, 2005). In line with Schumpeter’s concept of innovation, dynamic capabilities make firms

able to move away from equilibrium towards temporary monopolistic positions. In their concept of “innovation enabling capabilities”, Bender and Laestadius (2006) distinguish two dimensions of dynamic capabilities:

Transformative capabilities constitute the enduring ability to transform available general knowledge and competence into plant, firm or task specific knowledge and competence. Globally available codified knowledge is being accommodated and transformed for local use (contextualisation).

Configurational capabilities constitute the enduring ability to synthesise novelty by creating new configurations of knowledge, artefacts and actors. This implies “synthesising competences” of actors, their ability to tap dispersed knowledge to recombine it creatively, organisational competences to link actors, technology and relevant knowledge together, and design competences.

“The major task [for innovators] is not necessarily to develop and/or apply latest technological knowledge but innovation always entails the creation and management of sustainable new configurations of various types of knowledge, actors and artefacts. And an organisational precondition of this is the creation and reproduction of appropriate innovation enabling capabilities” (*Ibid.*, 141).

The evolutionary approach moves the firm as a social entity to the centre of analysis. It is the firm that recombines knowledge, technology, actors and artefacts. The firm in its context and with its heterogeneous networks and configurations is the dynamic actor in a capitalist, post-neoclassic Schumpeterian world of non-equilibrium competition. The development of the evolutionary theory of the firm was a huge step forward but still left a lacuna in the new innovation theory. Innovation trajectories are largely determined by the social context in which the firms and agents operate (Coriat and Weinstein, 2002). Innovation systems are historically conditioned combinations and it is not sufficient to explore only the endogenous institutional evolution of the private sector (Lundvall *et al.*, 2002). If innovation is an iterative collective learning process, external factors and actors cannot just be thought of as the environment but have to be transformed into interactive innovation partners and networks. This lacuna had to be filled by the innovation system approach.

The innovation system approach has an early forerunner in Friedrich List’s critics at Adam Smith in his “The National System of Political Economy” (1841) analyzing the way that an underdeveloped Germany could catch up with England (Freeman, 2002). “The national innovation system approach gained ground as empirical findings through the 1970s and 1980s revealed that innovations reflect a process where feed backs from the market and knowledge inputs from users interact with knowledge creation and entrepreneurial initiatives on the supply side. These relationships and interactions between agents involved non-market relationships and they were presented as organised markets with elements of power, trust and loyalty. It was also demonstrated that different national contexts offered disparate possibilities for establishing organised markets” (Research Policy, 2002: 188). Innovation systems emerge in a territorial (national and regional) and an industrial

(sectoral) dimension. Some authors even use the term technological innovation system, although here the concepts of technological paradigm or technological regime seem more appropriate (see Anderson and Tushman, 1990; Dosi, 1982). The concept of an innovation system implies a creative tension, present in any innovative process, between stability and continuity (systemic characteristics) and novelty and change (Schumpeter's creative destruction).

"Regional innovation systems were initially defined as interacting knowledge generation and exploitation sub-systems linked to global, national and other regional systems for commercialising new knowledge.(...) They are places where close inter-firm communication, socio-cultural structures and institutional environment may stimulate socially and territorially embedded learning and continuous innovation" (Heidenreich 2004, 363, 367). Social capital and networks explain differences in innovation capabilities between regions and nations, including low-tech sectors (Lundvall *et al.*, 2002). It is neither high-tech specialisation nor the intensity of research and development (R&D) but cross-sectoral and inter-firm cooperation that creates innovation capabilities.

The national and regional innovation system approach has been criticised for ignoring the important sectoral differences in innovative activities. The concept of "sectoral system of innovation" provides an analytical framework to grasp the inter-industry differences. "A sector is a set of activities that are unified by some related product groups for a given or emerging demand" (Malerba, 2004: 9). Any sector has a specific technological and knowledge base, learning patterns, actor networks and institutions (norms, standards, established practices and routines) that shape sector specific modes of innovation. Innovation in science-based industries like pharmaceuticals and biotechnology is very different from innovation in industries like machine tools, based on accumulated practical experience and specialisation (Nelson and Winter, 1977; Malerba, 2004). The innovativeness of a sector may also change with the life cycle, according to Schumpeter's distinction between "creative destruction" by entrepreneurs in new sectors with high uncertainty and low entrance barriers and "creative accumulation" in more developed mature industries with established hierarchies and high entrance barriers for newcomers.

In general terms, the empirical research on innovation patterns identifies two modes or ideal types of innovation, always in tension in firms, sectors and national innovation systems (Jensen *et al.*, 2006):

- STI-mode: Science, Technology, and Innovation based, placing the main emphasis on promoting R&D and creating access to explicit codified knowledge.
- DUI-mode: Doing, Using, and Interacting, mainly based on learning by doing, using and interacting.

They are not mutually exclusive, and any strategy to promote innovation needs to take both into account. Most innovative firms combine both strategies trying to reconcile formal processes of explicit and codified knowledge production with

learning processes from informal interaction within and between organisations, resulting in competence-building with tacit elements.

The new innovation theory that has been presented here offers a good set of analytical tools to analyse innovation processes in modern economies. However, these tools need to be reintegrated in a firm-centred, but context related, model to serve as an instrument for empirical research and to draw concrete policy conclusions. For this purpose, in the following section innovation theory will be combined with the profit strategy approach.

3. FIRM COMPLEXES AND INNOVATION STRATEGIES

The profit strategy approach originates in a theoretical criticism, supported by several empirical research programmes in the automotive sector, against the different “one-best-way” ideologies (from classical Taylorism to modern lean management and total quality management) in firm and management theory (Boyer and Freyssenet, 2000). Although developed for the analysis of automobile firms and industries, the approach can easily be adapted for general purposes and the analysis of innovation strategies. The theoretical challenge consisted in explaining the coexistence of different successful productive models and firms in the global car industry and the impossibility of combining the elements of these models in a voluntaristic manner. “One cannot be Einstein and Carl Lewis at the same time” (Boyer and Freyssenet, 1999: 87). For the purposes of the present study the profit strategy approach will be reformulated and integrated into an innovation strategy approach to accommodate all sorts of firms and industries.

The plurality of industrial models is a constant in capitalist development resulting from two main sources: the different social and economic environments and the different strategies of the firms. Over time firms develop a more or less coherent profit strategy which combines specific product policies, organisational schemes, industrial relations and governance models (stakeholder relations). These strategies cannot be changed in the short term without high risks and costs and therefore constrain the firm’s ability to act and determine their innovative capacity. On the other hand, a consolidated profit strategy opens a path to innovation, permits the development of specific innovative capabilities and resources and is a precondition for sustainable competitive advantage. High volume, low cost producers, for instance, may be very innovative in the organisation of production or logistics whereas high quality and specialised producers centre their innovative capacities on design, product development and technology. Profit and innovation strategies are constantly renewed and modified, but rarely changed fundamentally.

A profit strategy is not the result of voluntaristic, intentional decisions by management or any other dominant actor but reflects a more or less stable power network of heterogeneous actors with often contradictory interests. Firms are not clearly bounded, homogeneous agents but micropolitical complexes.

“A firm complex may be defined as a historically formed and consolidated, *i.e.* trajectory bounded, set of relations between internal and external interests/interest groups. By their activities, ownership structure, management practices, conflict regulation forms and political relations to the stakeholders a firm develops a specific field of action, a corridor of not only possible but likely strategies in certain contexts. These strategies are not individual forms of interest persecution but temporary outcomes of interest and power relations, *i.e.* politics” (Köhler, 2004: 127).

Following Boyer and Freyssenet, a firm’s profitability depends fundamentally on the appropriateness of its profit strategy within the environment, as well as the governance compromise established by the principal actors (directors, stockholders, banks, workers, unions, suppliers, etc.), which allows them to discover and implement means that correspond to the adopted profit strategy. “Productive models” may thus be defined as governance compromises, allowing for coherence between the means employed and the chosen profit strategies, that are viable within a considered spatial and historic context.

Profit strategies are combinations of “profit sources” in compatible proportions. There are six main profit sources: economies of scale, the diversity offered (product range), guaranteed quality, innovation, productive flexibility, and permanent reduction of costs. No single firm is able simultaneously to put all six profit sources to full use, and with the same intensity, since the different sources imply contradictory conditions and means. Firms must choose among a variety of profit source combinations. Profit strategies are not all equally relevant at all times and everywhere. Their degree of relevance, and thus profitability, depends above all on their compatibility with market and labour conditions found within the areas where they are implemented. Thus, a “volume” strategy implies continued progression in sales of undiversified products coupled with a labour force that enjoys increasing purchasing power and accepts Tayloristic working conditions. On the other hand, a “quality and specialization” strategy works well in areas where a large proportion of higher income consumers exists and where one may find the necessary skilled and specialized labour. The means employed to implement a profit strategy involve “product policy”, “productive organization”, and “employment relationships”. In practice, they often result from contradictory tensions between actors, or they correspond to responses to problems encountered as a result of successive modifications to the context, and they frequently make up productive configurations whose aspects have contradictory effects on a firm's performance. The relation between innovation and profit strategy may be illustrated by three of the multiple profit strategies to be found in our economies.

3.1. The “volume and diversity” strategy

This strategy combines two profit sources that initially appear to be contradictory, volume and diversity. How can one obtain economies of scale by increasing the variety of models offered? General Motors’ strategic invention in the 1930s

(Sloanism) consisted of overcoming this contradiction by having a maximum number of parts be shared by different models, and by limiting diversity to that perceived by the customer, the latter considered as the only commercially useful actor. Hence, diversity was centred on bodywork, interior design, and equipment. The innovative capabilities are centred in design, marketing and “commonization” (component sharing of different models), whereas the productive organisation followed traditional mass production patterns.

3.2. The “innovation and flexibility” strategy

This strategy consists in designing products that respond to emerging expectations or demands, and to mass produce them immediately if demand corresponds to expectations, or, if demand does not materialise, to abandon production rapidly and at the least cost. This requires national income growth and distribution modes wherein the needs and life styles of social categories evolve over time, or wherein new social categories that are economically and socially distinct from others emerge within the general population. It also requires that the firm adopting this strategy be financially independent so as to take the necessary risks. In addition, the firm must not be bound to its suppliers, so that it can rapidly change from one form to another if a type of production is to be changed. Last but not least, the firm must have an easily convertible production set-up and a labour force that allows it to be innovative both with regards to the product and the production process. In the car industry, this strategy was adopted by Honda, Chrysler, and Renault in the 1990s. Permanent product innovation and a high degree of absorptive capacity (Cohen and Levinthal, 1990) form an intrinsic part of this strategy.

3.3. The “diversity and flexibility” strategy

In this strategy diversity does not only lie on the surface as is the case in the “volume and diversity” strategy. It responds to a “balkanized” market characterized by highly differentiated customers (economically and socially) with pronounced identity demands. Homogeneity, coherence, and often mechanical excellence, not to mention overall quality, characterize this strategy. In this case, flexibility refers to the rapid adjustment to quantitative and qualitative changes in demand from different customers. This strategy requires permanent innovation in the organisation of production and products and therefore a highly qualified work force, fluent supplier relations and a participative governance model. Normally this strategy is adopted by smaller firms in highly competitive and segmented markets.

4. INNOVATION STRATEGIES: TWO EMPIRICAL CASES

As outlined above, firms or firm complexes are the main innovative actors developing a variety of profit strategies. This implies different innovation capabilities in the framework of sectoral and regional innovation systems. To illustrate this, a more detailed examination of two firms with many common features and context conditions but different innovation strategies will be presented. Two dairy firms located in the same region will be compared. These firms share the same sectoral and regional context. The results of this comparison are backed by other empirical findings in other sectors and countries (see the case studies carried out in the EU project on innovation in low-tech industries: www.pilot-project.org).

The profit strategy adopted by CAPSA, a dairy producer in northern Spain, corresponds to the “volume and diversity” model aiming at national leadership in the volume markets of milk and yoghurt. The governance model is determined by two main relationships. One deals with the main clients of CAPSA, the big retailers operating in the Spanish market. Although short-term tensions may arise, e.g. when CAPSA wants to launch a new product via campaigns in the supermarkets which require space and resources, this relationship is generally smooth and routinised. The second relationship, however, is a permanent source of conflicts affecting all dimensions of the production organisation. The main shareholder of CAPSA is a cooperative of farmers who deliver the milk. Their interests are to get a good price for their milk, well paid employment for their family members in CAPSA and redistribution of profits among the cooperative members. These interests increase the costs, reduce the investment budget and constrain the human resource policies of the firm and therefore stand against the interests of the dominant management group who are looking for competitive advantage and a broader capital base through acquisitions and alliances.

The current profit strategy is the historic outcome of a learning process which moved CAPSA from a mere volume producer of milk towards a diversified quality producer of dairy products. Since the 1980s Spanish dairy companies have faced ever stronger competition from foreign competitors and stagnant demand for liquid milk. At that time the company, which was still a cooperative, went into losses and had to change its strategy. In the early 1990s a new management team was hired, and the purchase of several smaller Spanish dairy companies resulted in the transformation of the firm into a private capital group (although the cooperative remained the biggest shareholder) and the development of new products with higher profit margins (yoghurts, desserts, cheese, special milks) started. Growth (mainly by acquisitions and alliances), quality and product diversification are the main elements of the new profit strategy, that brought CAPSA back to profitability and leadership in domestic markets.

The innovation strategy in CAPSA’s volume and diversity model encompasses the areas logistics (supply, transport and storing), automation of production, quality and food safety control and the invention of new products for growing market segments. One important innovation was that individual farmers were equipped with

quality control technology to guarantee the high quality of the raw material which could then enter directly the fully automated fabrication and packaging of the different dairy products. The next step in order to achieve a fast, smooth and cost efficient production flow from the farmer to the retail store was the complete modernisation of the storage depot, which is now equipped with a computer controlled storage system that automatically stores the products in the predetermined shelves and delivers the incoming trucks with the correspondent pallets.

The quality and safety innovations may be further illustrated by the recently developed use of ultra high sound frequency to detect contamination in dairy products. CAPSA produces almost two million litres of milk a day and it used to test product quality using tests that could take up to five days to complete, which meant that it normally had to keep ten million litres of milk in stock. The firm, in need of a faster and cheaper, but nevertheless fully reliable, system to test dairy quality, turned to the Acoustics Institute of the Supreme Council for Scientific Research. The company asked whether this institute could develop a machine that would be capable of detecting, by means of ultra high sound frequency, any sort of contamination of milk in a Tetra-Pak carton, which consists of seven different layers of material. The dairy factory provided the institute with all the necessary information on contamination and adulteration of dairy products. It took the Acoustics Institute two years of tests and improvements to develop a machine that fulfilled the requirements. The advantages of this new method are obvious: contamination is detected much faster than before, and a non-destructive way of testing has replaced the traditional sampling method (formerly, out of an annual production of 700 million litres of milk, a total sample of one and a half million bottles and cartons were tested and destroyed — an enormous loss of milk, money and time).

Product innovation has concentrated on new desserts and yoghurts and on 'healthy' derivatives such as milk enriched with vitamins, calcium and fibre. These R&D intensive activities clearly exceed the capacity of a firm like CAPSA which had to look for innovation allies. The R&D department, just five people, is mainly a networking group bringing together their own laboratory and production unit with several universities and public research councils, suppliers and other innovation partners. For instance, every two years CAPSA organizes a Research Forum, a conference lasting several days during which some 25 researchers from different universities and research centres meet with the firm's R&D, Marketing and Technology managers and brainstorm about possible innovation projects. CAPSA is constantly running co-financed research projects with external partners employing graduate researchers on short-term project contracts. Recently it obtained the newly created RDI Management Systems Certificate and adapted it to its own innovation process. In fact, as the R&D Manager observed: "We've been the first company in Spain that managed to certify its procedure of investigation and innovation — even before the electronics and automation branches". The norm the Certificate corresponds with (UNE 166002 Ex) sets the outlines of how to manage innovation, establishing

what technology is used, how to define the goals, what the job of the project manager implies, how the projects should be evaluated and with what frequency, and so on. The CAPSA innovation strategy, based on strategic networking and mobilization of external knowledge, may itself be considered innovative.

The second case is located in the same sector and region and the firm has a similar size and age, although it is somewhat smaller. ILAS started in the 1960s as a small Camembert cheese producer and has grown to be a diversified dairy company with several plants inside and outside Spain. At present, ILAS manufactures milk powder, butter, cheese and milk. In addition, several sub-products are being produced, such as baby foods, health mixes, and lactose-free milk. Many of the firm's products reach the consumer through shops and supermarkets, either under the *Reny Picot* brand name or as white brands. But the bulk of its overall production is sold to industrial clients like Unilever, Nestlé, Kraft, Hero and McDonald's.

The profit strategy of ILAS may be described as flexibility and diversity and the innovative capabilities are concentrated in the rapid development of customer specific products through close cooperation between the R&D laboratory, the production department and the customer, mostly big food companies. In addition, market niches left by the mass producers like CAPSA, such as hotels, restaurants, small stores and delicatessen shops, and catering firms, are served by ILAS through a dense distribution system of agents with specific products like packets of butter or cheese. Other clients who require flexibility are governments and NGOs that ILAS supplies for national campaigns or programmes like the Oil for Food Programme in Iraq.

The governance mode is less complex than in CAPSA with clear leadership being provided by a small group around the founder and main shareholder. A sort of benevolent paternalism allows relatively smooth industrial relations and the maintenance of an important labour force reserve of temporary employees, as the work force oscillates between 200 and 500 over the year in the main plant. ILAS is the main employer in the rural local labour market and strongly supported by local and regional authorities. To be able to meet the flexible demand, a huge overcapacity is maintained, with often quite outdated machinery which is only used in peak periods. The networking of people is a main knowledge management strategy and the leading group has diverse contacts with people in other companies and countries, in administrations and university departments.

Flexible customer-specific product development is the main profit source of ILAS and the centre of its innovation strategy. Together with Unilever, it developed a cholesterol reducing dairy product. Several years ago, ILAS produced fresh cheese for Danone; but the agreement was that, if the company decided to manufacture this product under its own brand name, it had to be in quantities of half a kilo or more. Thus, ILAS engineers came up with the idea to produce fresh cheese in Tetra-Pak. Initially, the problem was how to wrap the carton packaging around a piece of cheese. But soon the solution was found; some machines had to be adapted so that a liquid, not-yet-entirely-cheesy, product could be introduced into the Tetra-Pak; this cheese is then ripened inside the Pak. Moreover, the firm managed to

produce a fresh cheese with a sell-by period of five months, while 1 month had been standard up to that time. The initiative turned out to be a great success. “We look for products which need some technology, and which allow us to escape from the day-to-day struggles with the hypermarkets”, explained the plant manager, “And if, for instance, the price of Cheddar cheese in Ireland goes up, ILAS can immediately start producing Cheddar”.

A comparison of the profit and innovation strategies shows clear differences between the two neighbouring companies. Whereas for CAPSA, logistics, transport costs, brand marketing and automated mass production are critical factors, these are of hardly any importance for ILAS. As liquid milk and the products produced under their own brand name represent a small minority of their overall production, and the products for industrial clients require little logistical effort, ILAS can concentrate its dynamic capabilities on flexible product innovation and networking. ILAS also escape, to a considerable extent, the aggressive price competition imposed by the big retailers on their suppliers such as CAPSA. The strategic differences also show up in different structures and governance modes of the firm complexes. CAPSA has to deal with structural conflicts between shareholders and with strong labour unions. ILAS, in contrast, takes advantage of its employer monopoly in the local labour market and the rural cultural environment to reduce industrial conflict. The disadvantage of being located far from highways and transport systems does not affect ILAS in the same way as a mass producer because the delivery conditions are flexible and not conditioned by just-in-time management. CAPSA has to centre its innovative capabilities around the aim to improve market share, ILAS around the aim to improve flexibility in products, volume and niche markets.

In more general terms, the comparative case study shows the adjustment between profit strategies and innovative capabilities to be critical for economic performance of firms. Both companies achieved a leading position in terms of growth and innovation in their respective market segments. Since the strategic turn in the 1990s, CAPSA has gained leadership in the Spanish liquid milk, butter and creams market and the second position in yoghurts and desserts (behind world leader Danone) forcing the retirement of strong multinationals like Nestlé and Müller from these segments. With a turnover of €700 million and a work force of 1,600 people in its ten production facilities all over Spain, CAPSA is well positioned in these very competitive markets but faces a strategic handicap. The adopted “volume and diversity” strategy requires capital flexibility for alliances and acquisitions, but the majority of the shareholders are farmers grouped in the cooperative CLAS (Central Lechera Asturiana) with interests as privileged milk providers and against a capitalist growth strategy. This micropolitical conflict may put an end to the successful profit strategy of the past decade. In any event, the corresponding innovation strategy to volume and diversity has been the orientation of the resources and projects towards two main objectives: cost reduction and automation of production (new technologies in line production, food safety control and storage systems) and development of new products in growing market segments (yoghurts, desserts and

health food), a strategy centred in the development of transformative capabilities. ILAS, on the other hand, with similar size (€600 million turnover and 1,200 employees) and regional origin (Asturias in Northern Spain) follows its “flexibility and diversity” strategy in a much more stable micropolitical environment, with the owning family sustaining a long-term, constant growth strategy centred in national and international niche markets and special products for big customers. ILAS is not competing with the global food companies but attending their demands for flexible production and specific products. It is the only Spanish dairy producer with an international presence and production facilities in France, Poland, Mexico, USA and China. The innovation resources are concentrated in the development of configurational capabilities, particularly the ability to develop new products and derivatives in a short time and with high quality and safety.

Finally, the comparison also confirms that the strategies adopted imply choices and selections in favour of strength in some specific areas (firm specific, non-tradable capabilities) and weaknesses in others. CAPSA failed in its internationalisation attempts (an investment in Cuba had to be cancelled in 2005) and leaves smaller market niches out of consideration. ILAS, on the other hand, does not have the capabilities to attend mass markets.

5. CONCLUSIONS AND LESSONS FOR INNOVATION POLICY

The previous sections of this paper have outlined and illustrated several core characteristics of innovation processes:

- Innovations are collective societal processes with firms as core actors in a networked social context.
- There are no one-best-way innovation strategies but only a variety of innovation strategies as part of different profit strategies and in the context of different regional and sectoral innovation systems.
- Innovative capabilities of firms are path dependent and context bound.
- Innovations encompass all dimensions of economic activities (not just technology or products) and take place in all sectors (including low tech sectors), regions (including rural and old industrial regions) and types of firms (including small enterprises without R&D departments).

“The interactive character of the innovation process means to be effective, firms, regions, and nations need to develop organizational structures and mechanisms which promote continuous interaction and feedback within and between firms and among the various institutions which constitute the national system of innovation” (Cooke and Morgan, 1998: 13). The case studies showed the diversity of possible and successful profit and innovation strategies even in the same sector and regional context. These lessons have significant consequences for the design of effective innovation policies. As seen in the case studies, innovations are af-

ected by a variety of policy dimensions from global (Kyoto, international food safety norms, food help campaigns), to European (EU norms and policies like the milk quota system) down to local ones, but the most relevant level for strategic political influence in the innovative capabilities of firms is the regional one. It is at the regional level where interventions can be made in the complex interactions between firms, sectors, R&D institutions, administrations and other innovation relevant stakeholders.

A regional innovation policy should start with the study of the innovation strategies of the relevant firm complexes. The main element of innovation policies is the support for developing an effective innovation network of firms, R&D and design institutions, training and education providers, and technological and organisational consultants. Public authorities and policy makers are not administrators but monitors and facilitators in these networks building contacts, communication channels and cooperation infrastructures. These networks not only develop and initiate innovative activities but also formulate concrete innovation support demands to public authorities, universities and other potential allies. Innovation policy thus becomes iterative and communicative, developing its own trajectory and accumulated knowledge base. Innovation policy needs permanent innovation itself to improve its architectural capabilities (Henderson and Clark 1990), and its ability to recombine existing knowledge and actors in new and creative ways.

REFERENCIAS BIBLIOGRÁFICAS

- ANDERSON, P. y TUSHMAN, M.L. (1990): "Technological Discontinuities and Dominant Design: A Cyclical Model of Technological Change", *Administrative Science Quarterly*, 35, pp. 604-633.
- BENDER, G. (2006): *Peculiarities and Relevance on Non-Research-Intensive Industries in the Knowledge-Based Economy*, Final Report of the PILOT project (Policy and Innovation in Low-Tech), University of Dortmund, (www.pilot-project.org)
- BENDER, G.; JACOBSON, D. y ROBERTSON, P.L. (eds.) (2005): *Perspectives on Economic Political and Social Integration. Journal for Mental Changes*, Special Edition: Non-Research-Intensive Industries in the Knowledge Economy, 11 (1-2).
- BENDER, G. y LAESTADIUS, S. (2005): "Non-science based innovativeness. On capabilities relevant to generate profitable novelty", In Bender *et al.*, pp. 123-170.
- BOYER, R. y FREYSSNET, M. (1999): "Rewriting the Future. Profit Strategies, Forms of Internationalisation and New Spaces in the Automobile Industry", In Eckardt *et al.*, pp. 81-97.
- BOYER, R. y FREYSSNET, M. (2000): *Les modèles productifs*, La Découverte&Syros, Paris.
- COHEN, W.M. y LEVINTHAL, D.A. (1990): "Absorptive Capacity: A New Perspective on Learning and Innovation", *Administrative Science Quarterly*, 35, pp. 128-152.
- COOKE, P. (2004): "Regional innovation systems — an evolutionary approach", In Cooke *et al.*, pp. 1-18.
- COOKE, P.; HEIDENREICH, M. y BRACZYK, H.-J. (eds.) (2004): *Regional Innovation Systems. The role of governance in a globalized world*, Routledge, London/N.Y., 2nd edition.
- COOKE, P. y MORGAN, K. (1998): *The Associational Economy*, Oxford University Press, Oxford N.Y.

- CORIAT, B. y WEINSTEIN, O. (2002): "Organizations, firms and institutions in the generation of innovation", *Research Policy*, 31, pp. 273-290.
- DOSI, G. (1982): "Technological paradigms and technological trajectories. A suggested interpretation of the determinants and directions of technical change", *Research Policy*, 11, pp. 147-162.
- DOSI, G. (1988): "Sources, Procedures, and Microeconomic Effects of Innovation", *Journal of Economic Literature*, 26, pp. 1120-1171.
- DOSI, G. y NELSON, R. R. (1994): "An introduction to Evolutionary Theories in Economics", *Journal of Evolutionary Economics*, 4, pp. 153-172.
- ECKARDT, A.; KÖHLER, H.-D. y PRIES, L., (eds.) (1999): *Global Players in lokalen Bindungen. Unternehmensglobalisierung in soziologischer Perspektive*, Sigma, Berlin.
- ELLIOT, J. E. (1980): "Marx and Schumpeter on Capitalism's Creative Destruction: A Comparative Restatement", *The Quarterly Journal of Economics*, 95, August 1980, pp. 45-68.
- FREEMAN, C. (ed.) (1990), *The Economics of Innovation*, Edward Elgar, Aldershot/Brookfield.
- FREEMAN, C. (2002): "Continental, national and sub-national innovation systems — complementarity and economic growth", *Research Policy*, 31, pp. 191-211.
- FRIED, A. (2005): "Was erklärt die Resource-based View of the Firm? ", In Moldaschl, M. (ed.): *Immaterielle Ressourcen*, Rainer Hampp, München und Mehring, pp. 143-175.
- HEIDENREICH, M. (2004): "Conclusion. The dilemmas of regional innovation systems", In Cooke *et al.*, pp. 363-389.
- HENDERSON, R.M. y CLARK, K.B. (1990): "Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms", *Administrative Science Quarterly*, pp. 35, 9-30.
- JENSEN, M. B.; JOHNSON, B.; LORENZ, E. y LUNDEVALL, B. Å. (2006): *Forms of knowledge, modes of innovation and innovation systems*, Working paper, Department of Business Studies, Aalborg University.
- KÖHLER, H.-D. (2004): "The TNC as a Transnational Political Complex. Research Questions stemming from the DaimlerChrysler and BMW-Rover Deals", *Actes du Gerpisa*, n°. 36, pp. 127-142, <http://www.gerpisa.univ-evry.fr/actes/actes_index.html>.
- LAM, A. (2000): "Tacit knowledge, organizational learning and societal institutions: An integrated framework", *Organization Studies*, 21 (3), pp. 487-513.
- LOASBY, B. J. (2002): "The evolution of knowledge: beyond the biological model", *Research Policy*, 31, pp. 1227-1239.
- LUNDEVALL, B.-Å. (1996): *Information technology in the learning economy — Challenges for development strategies*, UNCSTD paper (United Nations Commission on Science and Technology for Development).
- LUNDEVALL, B. Å. (2002): *Innovation, growth and social cohesion. The Danish model*, Cheltenham, UK/Northampton, USA.
- LUNDEVALL, B.-Å.; JOHNSON, B.; ANDERSONEN, E. S. y DALUM, B. (2002): "National systems of production, innovation and competence building", *Research Policy*, 31, pp. 213-231.
- MALERBA, F. (ed.) (2004): *Sectoral Systems of Innovation*, Cambridge University Press, Cambridge Mass.
- NELSON, R. R. y WINTER, S. G. (1977): "In search of useful theory of innovation", *Research Policy*, 6, pp. 36-76.
- PENROSE, E. (1959): *The Theory of the Growth of the Firm*, Basil Blackwell, Oxford.
- RESEARCH POLICY 31, (2002): Editorial, pp. 185-190.
- SCHMIERL, K. y KÖHLER, H.-D. (2005): "Organisational learning: Knowledge management and training in low-tech and medium low-tech companies", In Bender *et al.*, pp. 171-221.
- SCHUMPETER, J.A. (1942, 1984): *Capitalism, Socialism, and Democracy*, Harper Textbooks, New York.
- TEECE, D. J.; PISANO, G. y SHUEN, A. (1997): "Dynamic capabilities and strategic management", *Strategic Management Journal*, 18 (7), pp. 509-533.